REMARKS

The present application was filed on January 17, 2002 with claims 1 through 22. Claims 1 through 22 are presently pending in the above-identified patent application. Claims 1, 3, 8, 9, 10, 12, 20, 21, and 22 are proposed to be amended herein.

5   In the Office Action, the Examiner objected to the specification and claim 20 due to indicated informalities and rejected claims 1, 2, 7-14, and 20-22 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner also rejected claims 8, 16, and 17 under 35 U.S.C. §102(e) as being anticipated by Liu et al. (United States Patent Number

10   6,744,727), and rejected claims 1, 3-5, and 21-22 under 35 U.S.C. §102(e) as being anticipated by Chaudhuri (United States Patent Number 6,324,162). The Examiner indicated that claims 6, 15, 18, and 19 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

The specification has been amended to correct typographical errors.

15   Formal Objections

The specification and claim 20 were objected to due to indicated informalities. In particular, the Examiner asserts that the phrase "the steps of the steps of selecting" in claim 20 should be corrected as "the steps of selecting..." The Examiner also asserts that the web site address http://www.dataconnection.com on page 11, line 4, should be removed.

20   Claim 20 and the specification (page 11, line 4) have been amended in accordance with the Examiner's suggestions.

Section 112 Rejections

Claims 1, 2, 7-14, and 20-22 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject

25   matter which applicant regards as the invention.

Regarding claim 8, the Examiner asserts that it is not clear what is meant by "a value of a function." The Examiner asks if "a predetermined value" on line 12 referred to "at

least one predetermined value" on line 4?

Applicants note that functions, objective functions, and values of functions, are terms that are well understand by a person of ordinary skill in the art. The "predetermined value" on line 12 may be, but is not required to be, the "at least one predetermined value" on line 5   4; this is a design choice, as would be apparent to a person of ordinary skill in the art. Please note that the limitation "a value of a function" has been amended to recite "a value of an *objective* function."

Regarding claims 1, 21, and 22, the Examiner asserts that it is not clear what is meant by "adjusting the minimum total cost through an exponential function based on an amount 10   of flows through links." The Examiner asks how the "exponential function" is related to "the minimum total cost?" The Examiner asks what is meant by "an objective value" in claims 1 and 7, and asserts that, if the "objective value" means the cost of flow, then it has to be clearly written.

In light of the present specification (see, page 8-13 and 15-26), a person of 15   ordinary skill in the art would understand the meaning of the limitation "adjusting the minimum total cost through an exponential function based on an amount of flows through links," and would understand the relationship of the "exponential function" and "the minimum total cost." Applicants note that the "objective" value is the target value for the minimization. Please note that the limitation "minimum total cost" has been amended to recite *"link costs."*

20   Regarding claim 2, the Examiner asks what is meant by "a function that represents a marginal cost of a link?"

Applicants note that the disclosure teaches the meaning of a function that represents a marginal cost of a link on page 18, line 13, to page 19, line 3.

Regarding claim 9, the Examiner asks what is meant by "updating until an 25   approximate solution to the network routing is within a predetermined error?"

As disclosed in the present specification on page 8, lines 13-15, "aspects of the present invention solve this problem by providing techniques that *quickly converge to a network*

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routing solution that is within a predetermined error from an optimal network routing solution."
(Emphasis added.) In light of the present specification, a person of ordinary skill in the art
would understand the meaning of the limitation "updating until an approximate solution to the
network routing is within a predetermined error."

5   Regarding claim 10, the Examiner asks what is meant by "a dual objective
function?"

Applicants note that the disclosure provides an in-depth teaching of dual objective
functions throughout the Detailed Description and, in particular, on page 19, line 4, to page 25,
line 23. In light of the present specification, a person of ordinary skill in the art would
10   understand the meaning of the limitation "a dual objective function."

Regarding claim 11, the Examiner asks what is meant by "the dual objective
function is part of linear program designed to maximize a first variable subject to a first plurality
of conditions?"

Dual objective functions are discussed in detail on pages 18-25 of the originally
15   filed specification. In light of the present specification, a person of ordinary skill in the art
would understand the meaning of the limitation "the dual objective function is part of linear
program designed to maximize a first variable subject to a first plurality of conditions."

Regarding claim 12, the Examiner asks what is meant by "an objective function as
part of second linear program...?"

20   Objective functions meeting the cited limitations are discussed in detail on pages
18-25 of the originally filed specification. In light of the present specification, a person of
ordinary skill in the art would understand the meaning of the limitation "an objective function as
part of second linear program..."

Regarding claims 13 and 14, the Examiner asks how is an exponential function
25   made or related to the cost updating?

Exponential functions and cost updating are discussed in detail on pages 8-13 and
15-26 of the originally filed specification. In light of the present specification, a person of

ordinary skill in the art would understand how an exponential function is made or related to the cost updating.

Regarding claim 20, the Examiner asks what is meant by "a value of a function" and asks if this referred to "a value of a function" in claim 8.

5   Functions are discussed throughout the originally filed specification and are well understood to a person of ordinary skill in the art. In light of the present specification, a person of ordinary skill in the art would understand the meaning of the limitation "a value of a function," and its relation to the "value of an *objective* function" in claim 8.

Independent Claims 1, 8, 21 and 22

10   Independent claim 8 was rejected under 35 U.S.C. §102(e) as being anticipated by Liu et al., and claims 1 and 21-22 were rejected under 35 U.S.C. §102(e) as being anticipated by Chaudhuri. Regarding claim 1, the Examiner asserts that Chaudhuri teaches routing a demand for one of the commodities on a set of paths, the set of paths comprising at least one primary path and at least one secondary path, wherein demand will be routed from a primary path to a

15   secondary path during a failure (FIG. 3; col. 7, lines 45-65; FIG. 4; col. 8, lines 50-60); adjusting the total minimum cost for each of a number of potential failures; iterating the (steps of) routing, adjusting, and performing until an objective value is minimized, whereby flow for each of the links in the network is determined (col. 5, lines 30-40). Regarding claim 8, the Examiner asserts that Liu discloses setting costs for each link in the network; initializing primary and second flows

20   for each link to at least one predetermined value; selecting a commodity, each commodity comprising a source-sink pair and having a demand; routing a demand through the network for the selected commodity; performing the steps of selecting, routing, and updating until a value of a function is at least as much as a predetermined value.

Independent claims 1, 21, and 22 have been amended to require a method for

25   determining routing in a network to achieve an objective value that is within a prescribed bound from its minimum value, comprising a plurality of nodes interconnected through links, where a demand for each of a plurality of commodities is to be routed over the network, the method

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comprising: concurrently routing a plurality of demands for each of the commodities on a set of paths having a minimum cost with respect to an iteratively changing cost function, the set of paths comprising at least one primary path and at least one secondary path, wherein each demand will be routed from a primary path to a secondary path during a failure; *adjusting the link costs*

5   *through an exponential function based on an amount of flow* through links over which the demand is routed, *wherein said adjustment is based on said at least one primary path and said at least one secondary path*; performing the step of adjusting for each of a number of potential failures; and iterating the steps of routing, adjusting, and performing until an objective value is reached which is within a prescribed bound of a pre-determined value, whereby flow for each of

10   the links in the network is determined. Independent claim 8 has been amended to require setting costs for each link in the network; initializing primary and second flows for each link to at least one predetermined value; *selecting a commodity, each commodity* comprising a source-sink pair and having a *demand*; routing a *demand* through the network for the selected commodity; *updating costs for links* over which the *demand* is routed, *wherein said update is based on said*

15   *primary flow and said secondary flow*; and performing the steps of selecting, routing, and *updating until a value of an objective function is at least as much as a prescribed bound of a pre-determined value.* Applicants could find *no* disclosure or suggestion in Chaudhuri of adjusting the link costs through an *exponential function based on an amount of flow* through links over which the demand is routed, *wherein said adjustment is based on said at least one*

20   *primary path and said at least one secondary path,* and could find *no* disclosure or suggestion in Liu of *updating costs for links* over which the *demand* is routed, *wherein said update is based on said primary flow and said secondary flow.* Support for these amendments can be found on pages 4-11, 15-21, and 26-29 of the originally filed specification.

Thus, Liu et al. and Chaudhuri, alone or in combination, do not disclose or

25   suggest concurrently routing a plurality of demands for each of the commodities on a set of paths having a minimum cost with respect to an iteratively changing cost function, the set of paths comprising at least one primary path and at least one secondary path, wherein each demand will

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be routed from a primary path to a secondary path during a failure; adjusting the link costs through an exponential function based on an amount of flow through links over which the demand is routed, wherein said adjustment is based on said at least one primary path and said at least one secondary path; performing the step of adjusting for each of a number of potential

5   failures; and iterating the steps of routing, adjusting, and performing until an objective value is reached which is within a prescribed bound of a pre-determined value, whereby flow for each of the links in the network is determined, as required by independent claims 1, 21, and 22, as amended, and do not disclose or suggest setting costs for each link in the network; initializing primary and second flows for each link to at least one predetermined value; selecting a

10   commodity, each commodity comprising a source-sink pair and having a demand; routing a demand through the network for the selected commodity; updating costs for links over which the demand is routed, wherein said update is based on said primary flow and said secondary flow; and performing the steps of selecting, routing, and updating until a value of an objective function is at least as much as a prescribed bound of a pre-determined value, as required by independent

15   claim 8, as amended.

Dependent Claims 2-7 and 9-20

Dependent claims 16 and 17 were rejected under 35 U.S.C. §102(e) as being anticipated by Liu et al., and claims 3-5 were rejected under 35 U.S.C. §102(e) as being anticipated by Chaudhuri.

20   Claims 2-7 and 9-20 are dependent on claims 1 and 8, respectively, and are therefore patentably distinguished over Liu et al. and Chaudhuri (alone or in any combination) because of their dependency from amended independent claims 1 and 8 for the reasons set forth above, as well as other elements these claims add in combination to their base claim. The Examiner has already indicated that claims 6, 15, 18, and 19 would be allowable if rewritten in

25   independent form including all of the limitations of the base claims and any intervening claims.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at

the telephone number indicated below.

The Examiner's attention to this matter is appreciated.

Respectfully submitted,

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Date: December 20, 2006

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